

Hyperbaric oxygen therapy in children with post-concussion syndrome improves cognitive and behavioral function: a randomized controlled trial

Amir Hadanny M.D., Ph.D., Merav Catalogna Ph.D., Slava Yaniv, Orit Stolar M.D., Lynn Rothstein Ph.D., Adi Shabi, Gil Suzin, Efrat Sasson Ph.D., Erez Lang, Shachar Finci, Nir Polak, Gregory Fishlev, Ruth Tock Harpaz, Moran Adler, Ron-El Goldman, Yonatan Zemel, Yair Bechor Ph.D. and Shai Efrati M.D.

Abstract

Persistent post-concussion syndrome (PPCS) is a common and significant morbidity among children following traumatic brain injury (TBI) and the evidence for effective PPCS treatments remains limited. Recent studies have shown the beneficial effects of hyperbaric oxygen therapy (HBOT) in PPCS adult patients.

This randomized, sham-control, double blind trial evaluated the effect of hyperbaric oxygen therapy (HBOT) on children (age 8–15) suffering from PPCS from mild-moderate TBI events six months to 10 years prior. Twenty-five children were randomized to receive 60 daily sessions of HBOT (n = 15) or sham (n = 10) treatments.

Following HBOT, there was a significant increase in cognitive function including the general cognitive score (d = 0.598, p = 0.01), memory (d = 0.480, p = 0.02), executive function (d = 0.739, p = 0.003), PPCS symptoms including emotional score (p = 0.04, d = - 0.676), behavioral symptoms including hyperactivity (d = 0.244, p = 0.03), global executive composite score (d = 0.528, p = 0.001), planning/organizing score (d = 1.09, p = 0.007). Clinical outcomes correlated with significant improvements in brain MRI microstructural changes in the insula, supramarginal, lingual, inferior frontal and fusiform gyri.

The study suggests that HBOT improves both cognitive and behavioral function, PPCS symptoms, and quality of life in pediatric PPCS patients at the chronic stage, even years after injury. Additional data is needed to optimize the protocol and to characterize the children who can benefit the most.

For the full study, visit <https://www.nature.com/articles/s41598-022-19395-y> or scan the code below.

